

## CASE REPORT

# An unexpected difficult intubation in a patient with myasthenia gravis undergoing video-assisted transcervical thymectomy

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## SUMMARY

Although there are different methods to evaluate predictive parameters of difficult intubation in apparently normal patients, sometimes this event is unpredictable. We herein report a clinical case of difficult intubation during anaesthesia for video-assisted thymectomy in non-thymomatous myasthenia gravis.

## BACKGROUND

Although anaesthetists use different methods to evaluate predictive parameters of difficult intubation, sometimes this event is unpredictable. Mastery with a number of advanced airway techniques should be sought, as multiple modalities may be needed when faced with managing an unexpectedly difficult airway.<sup>1 2</sup>

We herein report a clinical case of difficult intubation during anaesthesia for video-assisted thymectomy in non-thymomatous myasthenia gravis.

## CASE PRESENTATION

A 37-year-old, 165 cm, 68 kg woman was scheduled for thymectomy using a video-assisted transcervical approach for the treatment of non-thymomatous myasthenia gravis. The illness was diagnosed in 1995 after clinical examination, electromyography and CT chest. Acetylcholine receptors were negative. The diagnosis of myasthenia gravis, Myasthenia Gravis Foundation of America (MGFA) clinical classification class I, was made, and a total dose of 420 mg oral pyridostigmina (60 mg every 6 h and 180 mg once a night) was given. The patient had no underlying conditions and denied previous surgery. Preoperative arterial blood gas analysis revealed an arterial oxygen tension of 131 mm Hg, pH 7.44, and arterial carbon dioxide tension 45 mm Hg fractional inspired oxygen 21%. Laboratory data, ECG and haemodynamic values were in the normal range. A CT scan revealed a millimetric nodule in the apical segment of the right lower lobe and in the anterior mediastinum the presence of 2.6 cm parenchymal tissue compatible with a diagnosis of thymic hyperplasia. A concomitant non-functional goitre was found. The morning dose of pyridostigmina was given the day of surgery. The combination of predictors of difficult intubation were Mallampati score II, width of mouth opening=3 cm and thyromental distance=6 cm. In the operating room the patient was monitored with ECG, pulse oximeter and invasive arterial blood pressure and two peripheral venous were established. After 5 min of

preoxygenation, anaesthesia was induced using a target-controlled infusion of propofol Marsch model target plasmatic concentration (cpt) at a dose of 5 µg/ml and remifentanyl in continuous infusion total intravenous anaesthesia (TIVA) mode at a dose of 0.5 µg/kg/min with non muscle relaxant technique (NMRT). Laryngoscopy and intubation were performed at 8 min from the start of the drugs. The intubation condition score was considered satisfactory (intubation score 3). The first attempt of intubation was unsuccessfully performed by the resident using a 7.5 Fr tracheal tube. The second unsuccessful attempt was performed by the team leader using the same tracheal tube, and the third successful intubation was performed using a 6.5 Fr tracheal tube. Following the successful induction of general anaesthesia the haemodynamic parameters were stable throughout the operation.

Maintenance was performed using propofol target controlled infusion (TCI) mode cpt at 4 µg/ml and remifentanyl TIVA mode at 0.35 µg/kg/min. Intraoperative analgesia was performed using paracetamol 1 g (Perfalgan) and morphine 5 mg. There was no need to use muscle relaxants during the surgery. The thymus gland was removed via a video-assisted transcervical approach, and the operative time was 120 min.

Postoperative pain control was made using wound infiltration with ropivacaine 0.2% and continuous intravenous analgesia with morphine using elastomeric infusers at a fixed dose of 1 µg/h.

## OUTCOME AND FOLLOW-UP

After the video-assisted transcervical thymectomy was performed, the patient was weaned from the ventilator without difficulty and was transferred to the recovery room unit breathing spontaneously.

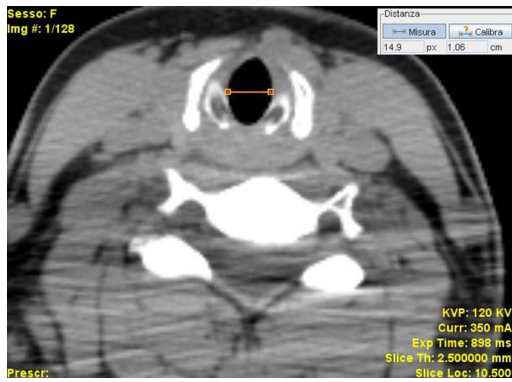
After 24 h the patient returned to the ward, and was discharged on the second postoperative day.

## DISCUSSION

It is well known that to achieve safe airway management, the first essential step is to predict whether there will be difficulties intubating or ventilating the patient's airway. After the preoperative evaluation of our patient we did not highlighted any abnormal parameters predictive of difficult intubation.

The non-muscles-relaxant technique used for transcervical thymectomy could be the reason for failure along with the first attempt performed by the resident. Therefore, the case was discussed<sup>3 4</sup>

**To cite:** Grasso N, Celestre C, Borrata F, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2013-010135



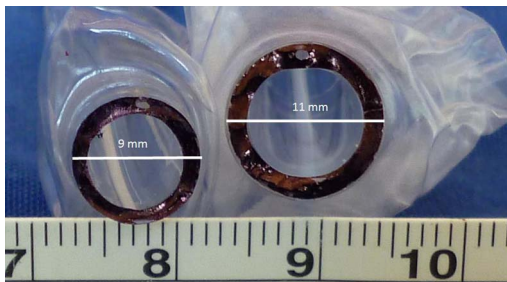
**Figure 1** CT scan showing the tracheal inlet with a diameter of 1.06 cm.

to uncover the clinical and etiopathogenic reasons of the unexpected difficulty encountered during intubation. Although different opinions between senior anaesthetists raised about the drugs management have been used, it was not possible to find an evident error during the anaesthesiological conduct of the perioperative management of our patient.

The case was then discussed at the multidisciplinary Team meeting, when it was decided to look the CT scan to observe if there was a mediastinal compression.<sup>5</sup> Surprisingly, we found that the patient had a very small tracheal inlet with an internal transverse tracheal diameter of only 1.06 cm (figure 1).

Measurements of the trachea from a postmortem study of adult airways<sup>6,7</sup> showed that the average tracheal diameter for men was 2.2 cm (range 1.5–2.7 cm) and 1.7 cm (range 1.3–2.5 cm) for women. The subglottic space that is defined as the area 5 mm below the vocal cords to the under surface of the cricoid cartilage has an average internal diameter of 1.7 cm.<sup>8</sup>

We measured the external diameter of the tracheal tubes, and we found that the 7.5 Fr tracheal tube measured 1.1 cm and the 6.5 Fr only 0.9 cm (figure 2).



**Figure 2** External diameter of the 7.5 Fr (right) and the 6.5 Fr (left) tracheal tubes.

In few words, in our case, it is evident that the difficult intubation was owing to the small diameter of the tracheal inlet which caused the impossibility to advance the 7.5 Fr tracheal tubes further down through the vocal cords.

### Learning points

- ▶ It is not a routine practice to review the diameter of the trachea before most surgical operation.
- ▶ A difficult intubation is not always owing to an error in the perioperative management during induction of anaesthesia but an anatomical cause such as a small trachea must be taken in account.
- ▶ Preoperative predictors of difficult intubation do not consider anatomical variations of the trachea, thus leading to underestimate the real difficulty that may be encountered during an intubation manoeuvre.
- ▶ Since this experience we review personally the CT scan in all patients who have a chest CT scan available before operation.

**Contributors** MM and NG conceived the manuscript. NG and CC drafted the manuscript. FB helped with the draft. MM performed the operation and coordinated the study. All authors read and approved the final manuscript.

**Competing interests** None.

**Patient consent** Obtained.

**Provenance and peer review** Not commissioned; externally peer reviewed.

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